of avoidance and aggressive responses. Our observations show that once the initial avoidance and aggressive behavior is depressed by alcohol, and the cock experiences direct bodily contact with the chicks during this period, maternal behavior may develop. Such experience does not result immediately in fully developed maternal behavior, but it serves as an essential starting point for its gradual development. There were no noticeable developmental changes in the avoidance and aggressive behavior of the controls. The appearance of active killing of the chicks on the fourth day was not associated with a general increase in frequency or intensity of previous aggressive behavior; it appeared to be elicited by the general sluggishness of the overexposed chicks and by their consequent inability to escape from the cocks. On the other hand, there was a definite developmental trend in all alcohol-treated cocks, except the one in the pilot study which did not shelter the chicks during the first night; either they gradually began to avoid the chicks and became more aggressive towards them, or their maternal behavior became more pronounced.

The development of alcohol-induced maternal behavior appears to be dependent on: (i) the critical state of the central nervous system brought about by the administration of alcohol; (ii) a primary contact with the newly hatched chicks during this state; and (iii) continued social interaction with the chicks. This process may contain important similarities with imprinting-like learning processes in birds.

JOSEPH K. KOVACH
Menninger Foundation, Topeka, Kansas

References and Notes

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3. We were led to the investigation of this phenomenon by an old custom, prevalent among Hungarian farmers, of transferring newly hatched chicks from the hen to a "drunken cock." The farmers justify this transfer by the argument that: (i) the cock is better than the hen at defending the chicks from predators; and (ii) such transfer frees the hen for returning to the commercially desirable egg-laying cycle.
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5. This study was supported by NIH grant FR-05517-04 and by The Menninger Foundation.

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Tektites are Terrestrial?

Faul (*1*) recently tried to show, on the basis of the chronology of tektites, that the old problem of their origin was definitely resolved (terrestrial). More-thorough examination shows there is nothing in it, and that it is only a matter of a collection—to tell the truth, very exceptional—of chance circumstances.

The K:Ar chronology has shown that the moldavites were contemporary (14.8 to about 1 million years) with the glasses of the Nördlinger Ries (*2*), but they are chemically different, as shown by Chao (*3*) and by Schnetzler and Pinson (*4*). Likewise the ivorites and the glasses of Bosumtwi Crater may be contemporary (1.3 million years), but they also are chemically different. Terrestrial glasses (volcanic or impact) always contain much more Fe_2O_3, less MgO, and much more water than do tektites. But, exceptionally, the glasses of the Ries have the mean composition of tektites, while the moldavites have an abnormal composition, containing more SiO_2 and less Al_2O_3, FeO, Fe_2O_3, MgO, and Na_2O; their color, green, also is different.

But the moldavites are 300 to 400 km from the Ries and the ivorites are 300 km from Bosumtwi, while volcanic or impact ejecta do not exceed 10 km. Exceptionally, a limestone block was projected 65 km from the Ries; a further projection of debris is conceivable only for Moon. The aerodynamic work of Adams (*5*) has established that tektites could not have traversed the atmosphere, beginning from the ground. Geological work, particularly that of Heide and the eminent and lamented Bucher (*6*), has established that the Ries and the Bosumtwi craters have an endogenous explosive origin and that coesite was not proof of impact. No crater can be associated with the American and the Pacific tektites, the latter being dispersed from China to Tasmania. The moldavites and the ivorites are therefore absolutely independent of the Ries or of Bosumtwi. The constant of proportion $Sr^{87} : Sr^{86}$ (*7*) establishes their common origin.

The K:A datings of terrestrial rocks and of tektites are very certain, likewise the U:Pb and Rb:Sr datings of terrestrial rocks, but the U:Pb and Rb:Sr datings of tektites are not sure. Chemical and isotopic analyses, as well as aerodynamic work, have shown that tektites have been raised, before their fall, to temperatures exceeding 2550°C (*3*, *4*), and that they have lost a notable fraction of their volatile constituents: alkaline, earth-alkaline, Pb, and such. Fast meteors show the color of stars F5, which corresponds to a temperature of 7000°K. It is thus that tektites could show all the U:Pb and Rb:Sr ages possible—between 10 and 2000 million years. These "ages" have no physical significance, and it is again by a chance effect that the "ages" coincide with those of the rocks of the Ries (300 million years) and of Bosumtwi (2000 million years).

Discussion of the problem of tektites should not therefore be confined to the sole consideration of their apparent chronology. A great deal of work has, on the contrary, demonstrated incontestably their cosmic origin. One of us has shown (*8*) how easy it is to conceive of the rapid transport of a block of obsidian (containing a little peridot and traces of nickel-iron, and coming from the debris of the original Olbers planet) from the asteroid rings to Earth, with a comet of the Jupiter family as intermediary; the fragmentation of the nucleus at perihelion; and the distribution by ablation of the tektites over a great stretch of the Pacific (Indochina, Indonesia, and Australia).

CICELY M. BOTLEY
Royal Astronomical Society, London W.1, England

A. DAUVILLIER
Observatoire du Pic du Midi, Bagnères, France

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